Estuarine habitat restoration in the context of rising sea-level: planning on a landscape scale.

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Mean global sea-level is predicted to increase by 50cm in the next century, and by an additional 20cm in the eastern Pacific. The ecological implications of this process are rarely incorporated into plans or strategies for estuarine habitat restoration in the Puget Sound area. A preliminary model linking sea-level rise to land elevation and vertical vegetation distribution in the Skagit delta indicates that a relatively modest rise of 45cm would have significant impacts on marsh vegetation. Approximately 10% (580 acres) of the Skagit tidal marsh would be converted to unvegetated sandflat. Rare tidal shrub and forest habitat would be reduced by nearly 50% and converted to emergent marsh. Future model elaborations will include the ameliorating effects on vegetation of sediment accretion, and possibly exacerbating effects of altered tidal regime and salinity. Nevertheless, even at this early stage some implications are clear. While, environmental managers currently acknowledge the need for habitat restoration to recover chinook populations, the need for additional restoration to offset habitat loss due to sea-level rise is less recognized. There is also a need to diversify restoration portfolios over the deltaic landscape to minimize climate risk to habitat diversity and to maximize the system's ecological resilience to stress.